WHAT IS CLAIMED IS:

1. A method of allocating resources for network capacity management of voice traffic in a packet based broadband network comprising:

a network architecture that decomposes the network into logical components;

an information model that contains the necessary information that must be defined for each type of the said logical components; and

the computation algorithms to determine the optimal network resources to be assigned to each said logical component;

whereas the said packet based broadband network comprising:

a plurality of packet based switching devices;

a plurality of voices switches;

a plurality of integrated access devices; and

a plurality of telephones;

whereas the types of the said voice switches comprising;

packet based voice switches that support hierarchical call blocking;

packet based voice switches that support a single level of call blocking; and

class 5 switches through the use of voice gateways.

2. The network architecture of claim 1 forming a tree structure comprising a plurality of trees subtending from each voice switch, wherein each node of the said trees represents a packet based switching device of claim 1.

3. An embodiment of the method of claim 1 for a broadband packet based network of claim 1 that is based on the asynchronous transfer mode technology, wherein permanent virtual circuits to a voice switch of claim 1 are aggregated into virtual path segments so that statistical multiplexing calculation methods can be applied to the individual said virtual path segments to allocate resources optimally.

4. A method of assigning blocking probabilities among the virtual path segments of claim 3 consistently in that the blocking probability of any said virtual path segment is equal to or less than the blocking probability of its parent virtual path segment.

5. A specification of the information that needs to be defined for each virtual path segment of claim 3 comprising:

identity of the said virtual path segment;
identity of the parent virtual path segment of the said virtual path segment;
type of the downstream node of the said virtual path segment;
list of the child virtual path segments of the said virtual path segment;
number of telephones that are attached directly to the said downstream node;
number of telephones supported by the said virtual path segment;
traffic profile of the said telephones supported by the said virtual path segment;
encoder and encapsulation scheme used;
required number of circuits associated with the said virtual path segment;
required equivalent bandwidth associated with the said virtual path segment;
currently assigned equivalent bandwidth associated with the said virtual path segment;
desired blocking probability of the said virtual path segment; and
identity of the physical link over which the said virtual path segment transverses.

6. An algorithm to compute the number of phones supported by the virtual path segment, which proceeds level by level and segment by segment from the highest level of the tree of claim 2 towards its root by adding the number of telephones that are attached directly to the downstream node and the number of phones supported by all its child virtual path segments.

7. An algorithm to compute the required equivalent bandwidth associated with the virtual path segment, which proceeds level by level and segment by segment from the root of the tree of claim 2 towards the highest level of the said tree, and comprises the following steps:

obtaining the required number of circuits associated with the virtual path segment, using the erlang formula or other means;

comparing the value of the said required number of circuits associated with the virtual path segment from the immediate above step with the value of the required number of circuits associated with its parent virtual path segment;

accepting the minimum of the two said values as the updated value for the required number of circuits associated with the virtual path segment; and

multiplying the said updated value of the required number of circuits associated with the virtual path segment by the equivalent bandwidth of a single call.

8. A variation of the algorithm of claim 7, that computes the blocking probability associated with the virtual path segments, instead of the required equivalent bandwidth associated with the said virtual path segment.

9. A variation of the algorithm of claim 7, that computes the number of telephones supported by the virtual path segments, instead of the required equivalent bandwidth associated with the said virtual path segment.

10. An output of the method of claim 1 showing the required equivalent bandwidth for each virtual path segment.

11. An output of the method of claim 1 showing the call blocking probability associated with each virtual path segment.

12. An output of the method of claim 1 showing the number of telephones supported by each virtual path segment.

13. An output of the method of claim 1 showing instances where the required equivalent bandwidth associated with virtual path segments within a threshold of the allocated bandwidth.

14. An output of the method of claim 1 showing instances where the total of the required equivalent bandwidth associated with all virtual path segments over a physical link exceeds a specified threshold.

15. An embodiment of the method of claim 1 for a broadband packet based network of claim 1 that is based on the frame relay technology through the use of overbooking capability of the frame relay switch.

16. An embodiment of the method of claim 1 for a broadband packet based network of claim 1 that is based on the internet protocol technology through the use of the differentiated service capability of the routers.

17. An embodiment of the method of claim 1 for a broadband packet based network of claim 1 that is based on the multi protocol label switching technology through the use of label switched paths.

18. A method of providing hierarchical call blocking feature in voice switches by maintaining in the said voice switches information comprising:
    parent-child relationship of the aggregate segments;
    resources allocated to aggregate segments; and
    telephone numbers associated with each aggregate segment;
    whereas the decision for blocking individual calls is based on the above said information and the current traffic load of the aggregate segments.